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ABSTRACT

This report explores the need for cost-benefit analysis in non-traditional education for the disadvantaged and presents practical suggestions and steps needed to carry out an effective analysis, based upon the experiences in the Community College of Vermont. Steps in such an anslysis include: (1) understand the informational needs of the various audiences; (2) identify the objectives of the decision-maker; (3) identify alternative means of obtaining these objectives; (4) identify costs and benefits of the various alternatives; (5) develop a model to predict future costs and benefits; (6) provide a criterion for ranking alternatives; and (7) remember that the decision-maker may choose to consider additional criteria in the final decision-making. (Author/KM)

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COST BENEFIT ANALYSIS:
NON-TRADITIONAL EDUCATION
FOR THE DISADVANTAGED

by Charles A. Parker

A report of the
National Dissemination Project
for the Community Colleges
1973

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FOREWORD

This report was prepared by the National Dissemination Project to suggest ways in which community college systems might better serve the needs of minority and disadvantaged students.

The National Dissemination Project is an outgrowth of ten earlier Office of Economic Opportunity projects undertaken by state community college agencies to develop comprehensive planning capacities to serve the disadvantaged and to provide institutional support in program development. It has become obvious from the high drop out rate alone, which often approaches 90 percent for disadvantaged students compared with a 30 percent attrition rate for other students, that community colleges are not successfully meeting the support service needs of disadvantaged students. New approaches and new planning efforts are a critical need.

The lessons learned in the OEO planning projects as well as in other innovative programs and projects across the nation have been assessed by the National Dissemination Project. In total, visits have been made to over 100 community colleges in 16 states, and contacts established with state directors and concerned groups and agencies.

This report explores the need for cost-benefit analysis in non-traditional education and presents practical suggestions and steps needed to carry out an effective analysis, based upon the experiences in the Community College of Vermont.

It is hoped that this report will serve as an introduction and a focus for concern. The National Dissemination Project will continue to provide resource information in helping individuals, colleges and systems better serve minority and disadvantaged students. This will be done by providing information, contacts and assistance in planning for change. For further information contact:

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COST-BENEFIT ANALYSIS

Non-Traditional Education for the Disadvantaged

Charles A. Parker

Introduction:

Educational planners and managers are rapidly adopting management science techniques which have long proven useful in government and industry. Techniques such as: operationalizing objectives, in-process evaluation, determining optimal program mix, and program budgeting are examples being utilized to improve and facilitate college management. Although some of the initial motivation for this movement has come from legislators and others demanding accountability, educators have been quick to grasp the usefulness of these techniques and to incorporate them into their management process. In this period of tightening money and a leveling off of demand among traditional college age students, these techniques have become increasingly helpful in evaluating alternatives and determining the most efficient allocation of limited resources.

This paper examines one of these techniques called cost-benefit analysis with particular emphasis on its usefulness in evaluating non-traditional education for the disadvantaged. The following is a brief clarification of some definitions, at least in the context of this paper. A cost-benefit analysis is a quantitative evaluative

technique that relates the total value of benefits of a program to the total costs of the program. It is an analytic study designed to assist decision-makers by providing a criterion for identifying a preferred choice among a number of competing alternatives. It provides information on how to maximize or optimize some desirable measure of output given a set of scarce or limited resources including a budget constraint. A non-traditional education encourages diversity by de-emphasizing time, location, and structure. The following are examples:

1. on-the-job training
2. using professionals outside the teaching field to teach
3. teaching where students feel comfortable
4. creating an active learning environment
5. teaching subject areas which include some not usually found in traditional education, such as:
   a. how to live more effectively in a particular environment
   b. how to learn throughout a lifetime
   c. how to more effectively use leisure time

A disadvantaged student is one who is financially and/or educationally disadvantaged. Financially disadvantaged is defined by welfare rights standards and educational disadvantaged is defined as one without a high school diploma or one who has dropped out of college for academic reasons.

This paper includes the following three areas in this order: the need for cost-benefit analysis in non-traditional education, general conclusions regarding costs per unit of service incurred in serving disadvantaged students by employing non-traditional

learning programs, and practical suggestions and steps needed to carry out an effective cost-benefit analysis. This paper will also present several specific examples from the Community College of Vermont for which a cost-benefit analysis has recently been completed. The Community College is a non-traditional, non-campus, community oriented two-year state college. The College utilizes existing facilities and community resources and operates in various regional locations throughout approximately half of Vermont. The College emphasizes education for the disadvantaged, offers courses based on student demand, and has a competency based degree program. Students are encouraged to become actively involved in their own program development and evaluation.

This brief overview of the Community College will be supplemented in the following sections to help clarify the various discussions.

Need:

The need for cost-benefit analysis in non-traditional education arises from both internal and external reasons. Internally, it serves as a management tool which is an integral part of the planning and budgeting process. It is utilized in evaluating alternatives among proposed programs for achieving various college objectives. For example, if a college objective is to attract fifty percent low income students, should the college employ special professional counselors to work on outreach and recruitment or should the college hire, on a part-time basis, low income students who are currently working on counseling degrees? There are both

obvious and disquised costs and benefits in each alternative. A cost-benefit analysis could be utilized to evaluate the two alernatives and in the process provide a selection criterion, such as selecting the alternative with the largest total benefit to total cost ratio. Since some costs and benefits, and this is more of a problem with benefits, will probably be unquantifiable, the final selection will remain up to the judgement of the decision-maker. However, this technique does provide him with more meaningful information with which to make his decision.

Next the various selected alternatives for all the college objectives could be ranked in the order of magnitude of their benefit-cost ratios. This would establish priorities for distributing available funds since, in most cases, there will be more programs with benefit-cost ratios greater than one (i.e. the benefits exceed the costs) than the available funds can support. Again the decision-maker's judgement would come into play during the final selection. This process aids the decision-maker in determining the most efficient allocation of limited resources.

A cost-benefit analysis is particularly useful in non-traditional education since this type of education is frequently less constrained by a history of, for example, investment in high fixed cost buildings and equipment, tenured faculty, etc. With fewer constraints, there are more alternatives available and thus an increased need for a screening and evaluation procedure. Also, many non-traditional teaching techniques are more expensive per student contact hour, for example, independent studies, tutorials, off-campus studies,

remedial studies, etc. These techniques may be necessary to meet the particular needs of a disadvantaged clientele and, therefore, also have greatly increased benefits. These differences are significant enough to warrant a very careful analysis.

Externally, a cost-benefit analysis serves as a vehicle for information sharing. As college managers attempt to internally determine the most efficient allocation of available funds, they must also provide support and justification for budget requests both from legislatures and other external sources. This period of tight money and increased competition for funds among institutions and agencies has brought increasing demands for accountability. A cost-benefit analysis can provide validation for funding requests and become an integral part of the funding process. It can also serve to illustrate how programs are prioritized and how the internal decision-making process works. This is particularly useful when outsiders argue that the increased funding requests just support a continually expanding bureaucracy with little relationship to actual changing needs.

As non-traditional institutions continue to explore various new and innovative techniques to provide a relevant and useful education, they will continue to encounter individuals who will argue that this is not education. This, and the fact that external cost and benefits of non-traditional are also somewhat different than in traditional education, necessitates more and better quality information. The following are a number of illustrations of why non-traditional education, particularly for the disadvantaged, has significantly different external costs and benefits. Many non-traditional students hold full-time jobs which avoids the real

cost inherent in traditional education of foregone wages of its students. Many have argued that this is the largest single cost of traditional education. Students can continue valuable work experience while in school and thereby contribute to the economic well-being of their community and state. Upgrading a community's educational level tends to decrease the crime rate. This reduces law enforcement costs, insurance rates, and personal losses. Unemployed students can upgrade their job skills and knowledge, placing themselves in a better position to secure employment. This tends to reduce costs to the state, such as Aid to Needy Families, Medical Assistance, General Assistance and Food Stamp programs. Lastly, an educated population tends to attract industry and have a positive economic effect on the entire community and state. These illustrate that training, particularly to the disadvantaged, creates significant indirect benefits to 'third parties' not in the educational programs.

The Community College is a three-year old institution which was funded by the Office of Economic Opportunity through June, 1973. In September, 1972, the Vermont State Colleges' Board accepted the Community College as a fifth state college. The Community College next prepared a budget request for funds to partially support operations in FY/74 and presented this request to the legislature. The current and recent Vermont legislatures have been very cool about increasing expenditures for higher education, and in fact, have level funded the state institutions in the last few years. Also, Vermonters and Vermont legislatures tend to be fairly conservative, particularly in financial matters. The brief description in the introduction illustrates that the

Community College is not a typical institution. Because of all these factors, one purpose of the Cost-Benefit Analysis: Community College of Vermont[1] was to provide decision-makers in the legislature with the necessary information to judge the feasibility of funding the Community College as Vermont's fifth state college.

The other purpose of this particular cost-benefit analysis was to provide the Community College with information for internal management decisions. Due to the Community College's loose flexible structure and because many of its decisions on educational questions have financial implications, there is a significant internal need for analysis and control. This cost-benefit analysis was an initial step in a movement to develop a comprehensive planning, programming, budgeting, implementation, and evaluation system. The technique of cost-benefit analysis will be an integral on-going part of this system.

General Conclusions:

It is difficult to provide general conclusions regarding costs per unit of service incurred in serving disadvantaged students by employing non-traditional learning programs. This difficulty arises from there being little consistency in the way various non-traditional institutions provide education. The following illustrates some areas of differences:

1. the use of competencies versus credits
2. evaluating past experience for credit or fulfilling competencies versus requiring all degree work under the sponsorship of the institution

3. the use of existing resources for classrooms and offices versus building campus facilities

4. offering courses based on student demand versus creating a course catalogue

5. attracting in-kind services from local communities versus not

6. differences in counseling and recruiting techniques

Also, there are very few institutions of either the traditional or non-traditional variety which have performed cost-benefit analyses, making comparative data scarce at best.

What is useful, is a careful examination of the Community College, the financial implications of its structure, and a comparison to the other public institutions in Vermont. The Community College utilizes existing community resources in the form of classroom and office space, equipment, teachers, libraries, etc. Teachers are skilled individuals from the community who usually hold regular full-time jobs and, in addition, teach for the Community College. They are part-time, untenured employees and are not paid for research or other activities not directly related to the student's learning experience. Also the counseling function, which in other institutions is usually performed by teachers, is performed at the Community College by full-time, extensively trained staff members who work in close coordination with the teachers. Lastly, since the Community College teachers are part-time, the College doesn't incur the standard 18 percent plus fringe benefit cost. These various characteristics allow the Community College to make much more efficient use of teaching resources. The pay is at the rate of seven dollars per in-class contact hour which allows complete flexibility as to the

length of courses. A typical fifteen week, three hours per week course, would create a teacher pay of $315 total. This compares favorably to the approximately $900 per course, plus fringe, paid at the Vermont campus-based public institutions.

The Community College does not have a campus and does not own buildings. Classrooms and office space are obtained through the use of existing facilities, usually rent free, but incurring some expense for utilities, upkeep, and janitorial services. Classes are held in high schools, youth centers, churches, homes, etc. Offices are located in Community Learning Centers, banks, high schools, other state colleges' facilities, etc. There is significant, continued motivation for superintendents and principals of high schools to expand the use of these high fixed cost investments, particularly for members of their community. Since the Community College is community based, taking its courses to the consumer, it is in a unique position to take advantage of these facilities. Estimates of the value of these in-kind services are above $75,000 per year. The Community College, therefore, can avoid the high fixed cost to taxpayers, in the form of interest and debt amortization charges for the 'brick and mortar' investments typical of other higher educational institutions. The University of Vermont's and the four campus-based Vermont State Colleges' debt service, not paid by special student fees, for FY/73 cost the taxpayers $2,550,000.

Local libraries are used by both students and teachers. There is an extensive interlibrary loan arrangement, through the Vermont State Regional Library system which allows individuals access to any book in most of the libraries in the state. The system is fast, efficient and has been heavily utilized to date. This library system is

particularly useful to the Community College since both are regional in nature and a typical college library could not serve the needs of teachers and students of the Community College.

A competency-based education also has a number of savings. It is administratively simpler since there are no grades, term averages or cumulative grade averages to calculate and record. There are no failures. If a student does not complete the course objectives, he does not take the entire course over, but just completes the unfinished part. Past experiences are evaluated for fulfilling competencies which not only avoids the time, effort, and cost of enrolling certain students in certain courses but also avoids boring these students by forcing them to sit through courses whose material they already understand.

There are also a number of expenses which are greater at the Community College than at traditional institutions. Because of its regional characteristic, mileage and telephone expense are relatively high. They have historically represented about 5% of the total expenses. Also a significant amount of staff time is spent traveling to meetings with both staff and students. The actual work time loss effect of this is lessened by staff sharing insights, information, and problems or by individuals dictating letters, etc. while traveling. There is presently an attempt to use conference calls for some meetings which may prove less costly. Next, the Community College's average class size is small, about ten students. This greatly facilitates personal sharing, individualized attention, and meeting specific needs, but is also more expensive. Lastly, counseling disadvantaged students requires extra staff effort and is, therefore, more costly. This additional effort, provided by the Community College

for low income and/or poor educational background individuals, costs, on the average, an extra $20.00 per course unit. As the college grows, students in counseling degree programs may be able to provide some of this service while gaining relevant experience and possible fulfilling a competency. This could significantly lessen this extra cost to the college.

Estimates of the average total cost per FTE (full time equivalent) for FY/74 are as follows:

Community College	$1,500.00
Other Vermont State Colleges	$2,400.00

This illustrates that although non-traditional education is, in many ways, more expensive, the Community College, through its unique structure, is able to produce its services for significantly less.

Some indirect costs are different also. As mentioned earlier, the Community College avoids the real cost of foregone wages among its students by scheduling classes so they can also hold full-time jobs. Most classes are held in the evening which leaves students free during the day, the time when the higher paying and the greater percentage of jobs are available.

Practical Suggestions and Steps

The following presents practical suggestions and steps needed to carry out an effective cost-benefit analysis. They represent a mixture of both technical and human process skills which may or may not be found in one individual. This may indicate the need for teamwork during the development and presentation stages of the analysis.

Initially it is important to carefully understand the needs of the report's various audiences. Internally, the managers need clear, concise, and easily understandable information which proves useful in the performance of their particular jobs. This means the analyst must spend some time talking with the staff and analysizing the various informational needs. Externally, the problem of clarity is magnified. The analyst must be careful to eliminate jargon which would be misunderstood or would turn off the readers. Also, in the process of creating a research design, it is important to carefully examine and discuss the needs of the external audiences. The importance of this step is obvious if one thinks of the many reports which cost a great deal of money, time, and effort and never result in any constructive change. A techniquely excellent report is useless if its conclusions are ignored.

If, as is likely, the study has a deadline date, it will probably be useful to identify action steps in its development. The timing of these action steps could be determined and monitored by using a CPM (Critical Path Method) or PERT (Program Evaluation and Review Technique) system. These management science techniques help the analyst ensure that the study is complete on the deadline date.

Lastly, among these initial suggestions, is that it is extremely useful to have a method or route for various individuals involved to feedback comments, questions, and problems. This information can be utilized in updating the study in order to continuously provide better information.

The more technical steps in this process are now considered. These steps arise from a need to have some orderly process in the

analysis. They are presented as a suggested way of proceeding which seems convenient, logical, and useful. There may be other more convenient ways of developing the analysis, and these steps should be viewed as open to modifications or supplementation to meet the individual needs of the user.

1. Identify the objectives of the decision-makers. Program objectives or desired program outcomes must be specified. The legislators' objective might be to provide higher education for the residents of his state. They might, on the other hand, want to have one prestigious institution which attracts the best students from all over the world. The individual college presidents may be interested in serving a certain select group within the total student population. One might want his to be the elitist institution, serving only the top high school graduates. Another might want to serve disadvantaged adults. The important point in this step is to determine and clearly specify what the decision-makers' objectives are.

2. Identify alternative means of obtaining the decision-makers' objectives. The alternative activities, proposed to implement the various programs, must be specified. They must be stated so that the output of any given activity is related to a relevant set of inputs. Frequently this is the most difficult step. The problem of generating good alternatives requires imagination.

3. Identify costs and benefits of the various alternatives. The next step in a cost-benefit analysis is the identification of costs and benefits of the various alternative programs. Both individual and social costs must be quantified in monetary terms. This may prove to be somewhat of a problem, since many of the benefits and some of the costs of a social program do not lend themselves to quantification. This may leave broad areas of assessment to assumption and judgement.

   Individual or private benefits are defined as the welfare gained by an individual as a result of education. They include:

   a. additional earnings attributable to education, net of taxes.

   b. fringe benefits associated with additional earnings.

c. stipends received while enrolled in an educational program.

d. the value of the option to enter other educational programs in the future.

Benefits to society or welfare gained by society as a result of education include:

a. gross additional earnings of individuals attributable to education.

b. the effects of reducing transfer payments

c. better citizenship

d. reduced costs of bad citizenship

The costs for an individual to invest in an education include:

a. the cost of not being able to work simultaneously in the labor market.

b. the cost of foregone leisure

c. the inability to engage in production at home.

d. the tuition and fees charged

The social costs incurred by educating individuals include:

a. current costs, such as teachers' salaries, heat, light, etc.

b. capital costs for both physical plant and instructional equipment

c. foregone earnings of students

These lists should serve as examples. Not all educational programs will have the same costs or benefits but it is important to identify those which it does have.

4. Develop a model to predict future costs and benefits. Following a quantification of both costs and benefits in monetary terms, the next step is to discount the future costs and benefits to the present. Both costs and benefits occur over a period of time and therefore must be converted to their present values. This is accomplished by discounting future costs and benefits back to the present with an appropriate rate of

discount. The discounted costs and discounted benefits are then summed to obtain the present value of benefits and present value of costs which will be compared by the benefit cost ratio. A great deal of writing has been done concerning the appropriate rate of discount for use in evaluating educational programs. The analyst should examine this literature and choose the appropriate discount rate for his situation.

5. Provide a criterion for ranking alternatives. The benefit-cost ratio equals the present value of benefits divided by the present value of costs. The decision rule then becomes: when the benefit-cost ratio exceeds unity, the alternative is economically superior to one with a lower benefit-cost ratio. The criterion is therefore, chosen first the alternative having the highest benefit cost ratio. Similarly, alternatives with benefit-cost ratios less than one should not be chosen.

There are a number of conceptual and practical problems involved in the application of cost-benefit analysis to education. First, the accumulation and analysis of information will never replace judgement. Only the decision-maker can reflect the final priorities established for his institution. The decision-maker may elect to consider additional criteria of a non-economic nature in the final decision making process. Next, clarity and simplicity should characterize reports and summarization of findings. The analyst should be sensative to the use of technical jargon. Also in non-traditional education, the staff may have reactions against the analyst, finding his ordering and quantifying a bastardization of their beautiful educational creation. Other problem areas include:

1. the treatment of benefits which cannot be measured in monetary terms.
2. the comparison of monetary benefits among different individuals.
3. the treatment of benefits which accrue outside a particular community.

It should not be concluded that these problems void the usefullness of a cost-benefit analysis. The point is to carefully understand the strengths and weaknesses of the tool and therefore be in a better position to use it properly.

The five steps of a cost-benefit analysis for the Community College materalized as follows:

1. The study assumed, based on inputs from legislators, educators, and state personnel, that one objective of decision-makers was to provide higher education for Vermonters. Statistics indicated that only 34 percent of Vermont high school graduates enter college, compared with the national average of 57 percent. This indicated that the objective was not being met and some corrective measures were necessary.

2. The most feasible alternatives appeared to be:

   a. expand existing public higher educational facilities

   b. construct other public, campus based facilities

   c. fund existing private institutions

   d. fund the Community College

3. The first three alternatives have costs per FTE of at least that of existing state colleges. This was presented earlier at $2,400.00. Also, estimates place the start-up cost of a new institution (i.e. alternative b.) at $14,000,000. The Community College's cost per FTE, again presented earlier, is $1,500.00. The college also avoids the cost of foregone wages since its students work while attending school. Its tuition charge is significantly less, which decreases this cost to the students.

   The Cost Benefit Analysis: Community College of Vermont also carefully examined the various benefits associated with the Community College's programs. These programs provided higher education to individuals in rural Vermont who otherwise could not receive this service. Statistics indicate that individuals with Associate degrees, on the average over their lifetime, earn more than individuals with only high school degrees. This not only benefits the individuals, but also increases taxable income. Other benefits include the various ones mentioned before, such as, reduced transfer payments, reduced crime, etc.

4. The following is a present value model which was used to deal with future earnings.[2] A similar model could be used for other benefits and costs when they extend over a number of years.

   A present value model is an analytical device to evaluate costs and benefits, both present and future, in terms of current dollars. It is a technique, frequently used in evaluating investments, for ranking alternatives which last over many years.

$$Va = \sum_{N=A}^{64} \frac{YaPn\,(1+x)^{N-A+1}}{(1+R)^{N-A+1}}$$

   Where:

   Va = the present value of all allocative educational benefits from age A through age 64.

   A = the average age of students receiving degrees from CCV.

   Ya = the annual increase in earnings associated with the education.

   Pn = the survival rate to age 65.

   R = the discount rate used to convert future earnings to their present value.

   X = the annual increase in earnings level due to rising productivity.

5. The criterion for ranking the four alternatives is the benefit cost ratios. The Community College's costs are less, both direct and indirect. Also its benefits are greater for the particular clientele it serves.

Conclusions:

Declining enrollments, budget cuts and demands for accountibility have motivated educational planners and managers to adopt management science techniques in their work. One of these techniques, cost-benefit analysis, serves both internal and external needs. Internally it serves as a management tool which is an integral part of the planning and budgeting process. It is particularly useful for

non-traditional education since this education is frequently less constrained, and with more alternatives available, there is an increased need for a screening and evaluation procedure. Externally, a cost-benefit analysis is an integral part of the funding process. It serves as a vehicle for information sharing and to support and justify budget request.

General conclusions regarding costs per unit of service incurred in serving disadvantaged students by employing non-traditional learning programs are unavailable. This is because there is little consistency in the way various non-traditional institutions provide education. The Community College, through its unique structure is able to provide higher education to the disadvantaged at a total cost per FTE of $1,500.00 per year.

Practical suggestions and steps needed to carry out an effective cost-benefit analysis include:

1. understand the informational needs of the various audiences.
2. Identify the objectives of the decision-maker.
3. Identify alternative means of obtaining these objectives.
4. Identify costs and benefits of the various alternatives.
5. Develop a model to predict future costs and benefits.
6. Provide a criterion for ranking alternatives.
7. Remember that the final choice is up to the decision-maker. He may elect to consider additional criteria of a non-economic nature in the final decision making process.

Lastly, the Community College of Vermont, after very close study by various legislative groups, received budget support from the legislature for its FY/74 operations.

Notes:

1. The Cost-Benefit Analysis: Community College of Vermont is available thru ERIC Document Reproduction Service, LEASCO Information Products, Inc., 4827 Rugby Avenue, Bethesda, Maryland, 20014. Order number ED 072773.

2. This model is a modified version of one in Herman P. Miller, et al. Present Value of Estimated Lifetime Economics, Washington, D.C.: U.S. Dept. of Commerce, Bureau of the Census, 1967, p. 2.

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